

Remarks/Arguments

Claims 1, 3-4, and 7-9 are pending and under examination in this application.

The Examiner rejects claims 1, 3, and 9 under 35 U.S.C. §102(b) as anticipated by Hakata, U.S. Patent 6,506,531 ("Hakata"). The Examiner, in the alternative, rejects claims 1, 3, and 9 under 35 U.S.C. §103(a) as obvious over Hakata. Applicants traverse both rejections.

Present claim 1 recites the following:

A resin coated carrier for an electrophotographic developer characterized by comprising spherical ferrite particles having an average particle size of 20 to 50 μm , a surface uniformity of 92 to 100%, an average sphericity of 1 to 1.3, and a sphericity standard deviation of 0.125 or less.

The carrier disclosed by Hakata is a magnetic powder dispersed carrier including fine particles of an inorganic substance mixed with a binder resin. The fine particles of the inorganic substance may be spherical, but generally only have a particle size in the range of 0.01-5.0 μm , and are preferably in the range of 0.1 to 2.0 μm . See Col. 4, l. 54-60. Only after treatment with the binder resin do the particles have a preferred size of 10-50 μm . See col. 6, l. 6-21.

As such, it is clear, first and foremost, that to the extent that spherical ferrite particles are disclosed at all by Hakata, the spherical ferrite particles do not have an average size of 20 to 50 μm , but are instead *one to two orders of magnitude smaller*. This is borne out in the Examples. See, e.g., col. 15, l. 5-8 ("500 g of spherical magnetite particles having an average particle size (D_{av}) of 0.24 μm and carrying aluminum oxide at the surface and 500 g of hematite particles (D_{av} = 0.4 μm) were charged...."); Col. 15, l. 40-41 ("1000 g of spherical magnetite particles (D_{av} = 0.31 μm) was charged..."); col. 15, l. 64-66 ("A mixture of 800 g of spherical magnetite particles (D_{av} = 0.31 μm) and 200 g of hematite particles (D_{av} = 0.60 μm)..."); col. 16, l. 24-26 ("A mixture of 900 g of spherical magnetite particles (D_{av} = 0.24 μm) and 100 g titanium oxide particles

($D_{av} = 0.30 \mu\text{m}$)...."); Col. 16, l. 49-50 ("1000 g of polyhedral magnetite particles ($D_{av} = 0.26 \mu\text{m}$)....").

Because Hakata does not disclose a resin coated carrier for an electrophotographic developer containing spherical ferrite particles having an average particle size of $20 \mu\text{m}$ to $50 \mu\text{m}$, it cannot anticipate the invention of claim 1, or claim 3 that depends therefrom.

The Examiner argues, in the alternative, that claims 1, 3, and 9 are obvious. Applicants traverse this rejection as well.

Hakata teaches a magnetic carrier comprising composite particles each comprising inorganic compound particles and a binder resin (see col. 2, l. 40-44). The carrier disclosed by Hakata is known in the art as a magnetic powder dispersed carrier, which is intended to be light-weight and have a low magnetic force. By dispersing the inorganic particles in a binder resin, one is able to achieve a long-lasting and high-quality image. The magnetic powder dispersed carrier according to Hakata is taught to generate a longer-life image because of the lightweight particles.

The magnetic powder dispersed carrier results in a longer life image in part due to its lightweight carrier material. However, there are certain drawbacks: the lightweight carrier material makes control of image density difficult, in part due to the fact that magnetic powder dispersed carriers tend to have high electrical resistance. In addition, because the magnetization is controlled by the quantity of inorganic substance particles dispersed in the matrix, balancing a consistent specific gravity, long image life, and other properties characteristic of image control can become difficult. Further, difficulties can occur with magnetic powder dispersed carriers can be easily broken by stress or agitation that occurs within the developer. Broken inorganic carrier particles may attach to a photoconductor and print to make a defective image.

Magnetic powder dispersed carriers have high residual magnetization and high coercive force; these result in inferior fluidity of the magnetic powder dispersed carrier. Specifically, when a magnetic brush is applied to the magnetic roll of a printer, the high residual magnetization and coercive force of the

magnetic powder dispersed carrier may make the magnetic brush hard, which may result in a lower quality image. Further, the magnetic powder dispersed carrier may magnetically coagulate when separated from the magnetic roll, and will not be smoothly supplied in a mixture with a toner. The rapid increase in the charge in a toner will be obstructed, which may cause toner scattering and/or fogging, which will result in defects in the image.

The magnetic powder dispersed carrier taught in Hakata includes fine particles dispersed in a binder resin make up a core material that is to be coated with a binder resin. In contrast, the present invention recited in Claim 1 is a resin-coated carrier which includes a spherical ferrite particle as a core material which is then coated with a resin.

As described above, the magnetic powder dispersed carrier taught in Hakata and the spherical ferrite carrier taught in the present invention have different core materials. One of ordinary skill in the art would not consider these materials to be similar, and as such, though some properties may have overlapping values, any comparison between them is meaningless because of the difference in core material. One of ordinary skill in the art would thus not be motivated to modify the magnetic particles described in Hakata to make them larger, because the magnetic particles described in Hakata are intentionally small in order to achieve longer image life and a high quality of image. One of ordinary skill in the art would thus not be motivated to make the magnetic particles bigger, and thus invention recited in claim 1, as well as the inventions in claims 3 and 9, which depend from claim 1, cannot be obvious over Hakata.

The Examiner has also rejected claims 4 and 7-9 under 35 U.S.C. §103(a) as unpatentable over Hakata in further view of Hultman, U.S. Pre-Grant Publication No. 2003/0177867 ("Hultman"). Applicants traverse.

Hultman discloses an invention relating to a production method for an iron-based powder. Claim 1 of Hultman recites the production method for an iron-based powder having a certain level of magnetic properties and electric properties; the iron-based powder comprises 0.5% by weight of silicon-containing iron and 10% by weight of an iron metal and/or iron alloy. Preferably, the iron-

based starting material is magnetite and/or hematite, or another iron-containing compound, such as hydrated ferric oxides, goethite, ore lepidocrocite, or ferric salts. (Paragraph [0015]). The method for producing this powder includes the steps of blending a powder containing iron and a powder containing silicon, followed by reduction at a temperature of 405 °C or more. The granules are then sintered, and in several examples the granules are sintered in a hydrogen atmosphere at temperatures below 1200 °C. See, e.g., paragraphs [0161], [0168], [0170].

Present claim 4 recites the following:

A process for producing a resin-coated carrier for an electrophotographic developer, the process comprising weighing and mixing ferrite raw materials, crushing the mixture, granulating the obtained slurry, sintering the granules, and coating the sintered material, with a resin, characterized in that the granules are pre-sintered at 500 to 700 °C before sintering, the sintering is performed for 0.1 to 5 hours at a sintering temperature of 1200 to 1400 °C while the granules are made to flow by fluidizing means.

Claim 4 does not recite carrying out pre-sintering in a reducing atmosphere as is taught by Hultman. Further, neither Hultman nor Hakata teaches or suggests making the granules flow by fluidizing means. Further, the Office has identified no reason why one of ordinary skill in the art would modify the processes taught by Hultman or Hakata to include the step of making the granules flow by fluidizing means during sintering. To this point in prosecution, the Office has not yet identified a reason why one would choose to modify the prior art and make ferrite particles flow by fluidizing means during sintering, and the present Office Action ignores this limitation of claim 4 entirely. Further, while Hultman states that the particles can be sintered at temperatures up to 1450 °C, the examples disclosed in Hultman only teach sintering at temperatures below 1200 °C, and thus teaches away from sintering the particles at a sintering temperature of 1200 °C to 1400 °C. As such, claim 4, and claims 7-8 that depend therefrom, cannot be obvious over Hakata in combination with Hultman.

The Examiner also rejects claims 7 and 8 under 35 U.S.C. § 103(a) as obvious over Hakata and Hultman, in further view of Mizutani et al., U.S. Pre Grant Publication No. 2005/0214671 ("the Mizutani '671 publication").

Applicants noted in the previous office action that the Mizutani '671 publication is not prior art to the present application. The Mizutani '671 publication was filed on October 13, 2004, which is slightly over a month prior to the filing of the present application, which was filed as a PCT Application on November 25, 2004. However, the Mizutani '671 publication was filed **after** JP-03-424762, which was filed on December 22, 2003, to which the present application claims priority. Applicants submitted a translation of the priority document JP-03-424762, and a certification of such translation as accurate, along with the response to the previous Office Action. As such, the Mizutani '671 publication cannot be prior art to the present application under any section of 35 U.S.C. §102, as Applicants have sufficiently demonstrated that the claimed invention was made prior to the effective date of the Mizutani '671 publication. As such, claims 7 and 8 are not obvious over Hakata and Hultman because claim 4 is not obvious over Hakata and Hultman.

In view of the remarks, it is submitted that the present application is now in condition for allowance. Reconsideration and allowance of the pending claims are requested. The Director is authorized to charge any fees or overpayment to Deposit Account No. 02-2135.

Respectfully submitted,

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